STÉPHANIE M. SWARBRECK (NÉE BERNARD)

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EDUCATION

PhD Rothamsted Research and School of Biological Sciences, Lancaster University 2002-2005
Advisors: Dimah Z. Habash, Christine H. Foyer and Brian G. Forde

Maitrise (Master's degree by instruction; with honours), Université de Nantes (France), Engineering School in Chemistry-Biology and Rothamsted Research. 2000-2001

Licence (Bachelor's degree; with honours), Université de Nantes (France), Engineering School in Chemistry-Biology 1999-2000

PROFESSIONAL EXPERIENCES

Postdoctoral fellow, Earth Sciences Division, Lawrence Berkeley National Laboratory (CA) and the Department of Integrative Biology, University of California, Berkeley (CA). *September 2005- September 2010*

Project: An annual grassland mesocosm exploration of scaling from genomes to ecosystem function

- Investigation of the coordinated responses to climate change of plants and soil microorganisms from a California annual grassland ecosystem with the aim of linking the responses from gene to ecosystem
- Cloning of genes associated with plant carbon and nitrogen metabolism and analysis of transcript abundance using real-time RT-PCR in both the roots and leaves of plants grown under differing climatic conditions
- Analysis of four cDNA libraries of *Avena barbata* sequenced using Sanger and 454-FLX pyrosequencing method in collaboration with the Joint Genome Institute

Project: Exploiting cyanobacteria for carbon sequestration

- Optimization of growth conditions for several species of cyanobacteria
- Extraction and measurements of recalcitrant carbon compounds

Graduate Studies, Crop Performance and Improvement division, Rothamsted Research (UK) and School of Biological Sciences, Lancaster University. *March 2002- September 2005*

Project: Developing wheat with enhanced nitrogen use efficiency towards sustainable system of production

- Manipulation of the expression of cytosolic glutamine synthetase (GS) in wheat (*Triticum aestivum* L.) using particle bombardment
- Transformation protocols were optimized for three Doubled Haploid (DH) lines from the cross Chinese Spring x SQ1
- Characterization of the wheat GS genes transcript profile and identification of two cytosolic GS genes involved in nitrogen remobilisation in senescing wheat leaves
- Analysis of three DH lines and a former commercial variety suggested that there is genetic variability in leaf GS activity and protein profile in wheat germplasms
- Phylogenetic analyses of the GS sequences from plants of the Poaceae family that led to the identification of three phylogenetically and functionally distinct GS sub-families

Research assistant, Crop Performance and Improvement division, Rothamsted Research (UK).
March 2001- February 2002

- Analysis of the transcripts of two antioxidant enzymes, ascorbate peroxidase and catalase, in drought-stressed wheat and *Arabidopsis thaliana* (wild type and the *Vtc-1* mutant deficient in ascorbate).
- As part of an EU funded project entitled 'Senescence and Oxidative Stress' I carried out measurements of enzymes activity and metabolites involved in scavenging of reactive oxygen species during the senescence of pea (*Pisum sativum*) nodules

MENTORSHIP AND SUPERVISORY ROLES

I have supervised undergraduate students who took part in internships at LBNL. I have also hired and supervised research assistants who assisted with laboratory and greenhouses experiments at LBNL.

Summer 2010- Fallon Frye (Cal Poly, San Luis Obispo), "Cyanobacteria and biosequestration: The effects of high CO_2 on calcifying *Synechococcus*."

Summer 2008- Laleh Esmaili (Laney College, Oakland, CA), "Climate change effects on leaf gene expression in *Avena barbata* grown in monoculture and mixed communities".

Summer 2007- Laleh Esmaili (Gavilan College, Gilroy, CA), "The effect of nitrogen addition and three rainfall treatments on transcripts abundance in *Avena barbata* leaves".

Spring 2007- Elyse Perruchon (Oberlin College, Oberlin, OH), "Gene expression studies in the root of *Avena barbata* grown in monoculture and in mixed community with *Hordeum murinum* and submitted to mild drought"

INVITED PRESENTATIONS

2009- Department of Biology, University of York, UK.
2007- Statistical analysis and data integration in plant genomic ecology research Workshop, Urbana, IL, USA
2007- Ecological Society of America Annual Meeting, San Jose, CA, USA.
2006- Gene in Ecology, Ecology in Genes. Kansas State University, Kansas City, MO, USA.
2006- The Rank Prize fund mini-symposium, Can we improve the utilization of Nitrogen in cereals? Grasmere, UK.

METHODOLOGICAL SKILLS

LAB-BASED: Wheat transformation using particle bombardment, tissue culture, DNA/RNA extraction, cloning, PCR, real-time PCR, protein extraction, one and two dimension western blot, enzyme assays, HPLC anion exchange, *E. Coli* transformation, bacterial culture, and light microscopy.

BIOINFORMATICS: BLAST, multisequences alignment (e.g., Clustal, MUSCLE), clustering, analysis of INTERPROSCAN results, microsatellites markers, functional annotation using tools such as Prot4EST, familiarity with unix and perl. Experience in uni- and multivariate statistical analyses such as analyses of variance, non-parametric method (Chi-square), and principal component analysis. Familiarity with R statistical environment.

LANGUAGES

Fluent in French (mother tongue) and English, conversational Spanish

PROFESSIONAL ACTIVITIES AND AFFILIATIONS

Member of the American Society of Plant Biologists
Journal reviewer: New Phytologist (2007, 2009, 2010), Functional Plant Biology (2009)

GRANT AND AWARDS

2007- Divisional Program Development Grant: 'Genomic Basis of Plant Response to Soil Heterogeneity' ($20k)
2007- Laboratory Science Program, Joint Genome Institute (Department of Energy, USA): 'Sequencing of four cDNA libraries from *Avena barbata*, using both Sanger sequencing and 454 FLX-pyrosequencing'.
2006- Prize for best presentation awarded at the Rank Prize symposium 'Can We Improve the Utilisation of Nitrogen in Cereals?'

PUBLISHED ARTICLES (H-INDEX = 8)

13. **Swarbreck SM**, Lindquist E, Ackerly DD, Andersen GL. Analysis of leaf and root transcriptome of soil grown *Avena barbata* plants. Plant and Cell Physiology, in press.

12. **Swarbreck SM,** Defoin-Platel M, Hindle M, Saqi M and Habash DZ. New perspectives on glutamine synthetase in grasses. Journal of Experimental Botany, in press.

11. **Swarbreck SM**, Sudderth EA, St.Clair SB, Salve R, Castanha C, Torn MS, Ackerly DD, Andersen GL. Linking leaf transcripts levels to whole plant analyses provides mechanistic insights to the impact of warming and altered water availability in an annual grass. Global Change Biology, in press.

10. Wu CH, **Bernard SM**, Andersen GL, Chen W. (2009) Developing microbe-plant interactions as biotechnological tools. Microbial Biotechnology 2: 428-440

9. **Bernard SM**, Habash DZ. (2009) The importance of cytosolic glutamine synthetase in nitrogen assimilation and recycling. New Phytologist 182: 608-620

8. Leakey ADB, Ainsworth EA, **Bernard SM**, Markelz RJC, Ort DR, Placella SAP, Rogers A, Smith MD, Sudderth EA, Weston DJ, Wullschleger SD, Yuan S. (2009) Gene expression profiling – opening the black box of plant ecosystem responses to global change. Global Change Biology 15: 1201-1213

7. **Bernard SM**, Blom Møller AL, Dionisio G, Jahn TP, Baudo M, Lopes MS, Tercé-Laforgue T, Foyer CH, Parry M, Forde BG, Araus JL, Hirel B, Schjoerring JK and Habash DZ. (2008) Gene expression and function of glutamine synthetase isozymes in wheat (*Triticum aestivum* L.). Plant Molecular Biology 67:89-105

6. Habash D, **Bernard S**, Schondelmaier J, Weyen J and Quarrie S. (2007) The genetics of nitrogen use in hexaploid wheat: N utilisation, development and yield. Theoretical and Applied Genetics 114: 403-419

5. Groten K, Dutilleul C, van Heerden PDR, Vanacker H, **Bernard S**, Finkemeier I, Dietz K-J, Römer P and Foyer CH. (2006) Redox regulation of peroxiredoxin and proteinases by ascorbate and thiols during pea root nodule senescence. FEBS Letters 580: 1269-1276

4. Groten K,Vanacker H, Dutilleul C, Bastian F, **Bernard S**, Carzaniga R, Foyer CH. (2005) The roles of redox processes in pea nodule development and senescence. Plant Cell & Environment 28: 1293-1304

3. Luna CM, Pastori GM, Driscoll S, Groten K, **Bernard S**, and Foyer CH. (2005) Drought controls on H_2O_2 accumulation, catalase (CAT) activity and *CAT* gene expression in wheat. Journal of Experimental Botany 56: 417-423

2. Pastori GM, Kiddle G, Antoniw J, **Bernard S**, Veljovic-Jovanovic S, Verrier PJ, Noctor G, Foyer CH. (2003) Leaf vitamin C contents modulate plant defense transcripts and regulate genes that control development through hormone signaling. Plant Cell 15: 939-951

1. Kiddle G, Pastori GM, **Bernard S**, Pignocchi C, Antoniw J, Verrier PJ, Foyer CH. (2003) Effects of leaf ascorbate content on defense and photosynthesis gene expression in *Arabidopsis thaliana*. Antioxidants and Redox Signaling 5: 23-32

PDFs are available at http://esd.lbl.gov/about/staff/stephaniebernard/publications.html

PUBLISHED ABSTRACTS (LAST THREE YEARS))_____

Developing molecular tools for studying the response of the wild grass *Avena barbata* to climatic changes (2009)**. Bernard SM**, Lindquist E, Wilks C, Ackerly DD and Andersen GL. Evolutionary and Ecological Functional Genomics. Gordon Research Conference, Tilton, NH.

The long-term effects of drought and high temperature on N metabolism in a C_3 grass (2008). **Bernard SM**, StClair SB, Sudderth EA, Torn MS, Ackerly DD and Andersen GL. American Society of Plant Biologists. Annual Meeting Mérida, Mexico.

Linking the response of annual grasslands to warming and altered rainfall across scales of gene expression, species, and ecosystem. (2007) Torn MS, **Bernard SM**, St.Clair SB, Fischer ML, Hopkins FM, Placella SA, Castanha C, Sudderth E, Herman DJ, Salve R, Ackerly DD and Firestone MK. AGU, San Francisco, CA.

A molecular analysis of plant response to global climate change in an annual grassland (2007). **Bernard SM**, StClair S, Placella S, Firestone M, Salve R, Ackerly DD and Andersen GL. Ecological Society of America, annual meeting, San Jose, CA.

Connecting soil microbial N-transformations to plant N-processing (2007). Firestone MK, Placella SA, **Bernard SM,** Herman DJ, Brodie EL, Andersen GL, St Clair S and Ackerly DD. Ecological Society of America, annual meeting, San Jose, CA.

A molecular approach to understanding plant response to global climate change in a Californian grassland ecosystem (2007). **Bernard SM**, St. Clair S, Placella S, Firestone M, Torn MST**,** Ackerly DD and Andersen GL. Plant biology and Botany- Joint congress, Chicago, IL.